State of Utah
JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

Department of
Environmental Quality

Richard W. Sprott
Executive Director

DIVISION OF ENVIRONMENTAL
RESPONSE AND REMEDIATION
Brad T Johnson
Director

ERRC-161-08

September 10, 2008

Gwenette R. Christiansen, NPL Coordinator
U.S. EPA, Region 8
1595 Wynkoop Street 8EPR-B
Denver, Colorado 80202-1129

Dear Ms. Christiansen:

Enclosed for your review is the *Site Investigation Work Plan (SI)* for the **5600 South 900 East Plume** (CERCLIS ID# UTN000802664) Site located in Murray, Utah. A Preliminary Assessment was submitted for the Site on July 10, 2008.

After reviewing the *SI*, please inform us of any comments or changes that need to be incorporated in the final version of the document. If you have any questions concerning the contents of this *SI*, please contact Kim Viehweg at (801) 536-4161.

Sincerely,

Brent H. Everett
CERCLA Branch Manager
Division of Environmental Response and Remediation

BHE/KV/eds

Enclosure(s)

168 North 1950 West • Salt Lake City, UT
Mailing Address: P.O. Box 144840 • Salt Lake City, UT 84114-4840
Telephone (801) 536-4100 • Fax (801-359-8853 • T.D.D. (801) 536-4414
www.deq.utah.gov

SITE INVESTIGATION
WORK PLAN

5600 South 900 East Plume
Salt Lake County, Utah
UTN000802664

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY
Division of Environmental Response and Remediation
Prepared by: Kim Viehweg

SITE INVESTIGATION WORK PLAN

5600 South 900 East Plume

Salt Lake County, Utah

UTN000802714

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY
Division of Environmental Response and Remediation
Prepared by: Kim Viehweg

Draft:	Date:	8/11/08	Initials:	KV
Revision:	Date:		Initials:	
Final:	Date:	09/23/08	Initials:	GRC, EPN

SITE INVESTIGATION
WORK PLAN

5600 South 900 East Plume
Salt Lake County, Utah
UTN000802664

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY
Division of Environmental Response and Remediation
Prepared by: Kim Viehweg

TABLE OF CONTENTS

LIST OF FIGURES, TABLES, AND ATTACHMENTS

FIGURES:

TABLES:

ATTACHMENTS:

1.0 INTRODUCTION

Under authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, the Superfund Amendments and Reauthorization Act (SARA) of 1986, and in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the Utah Department of Environmental Quality (UDEQ), Division of Environmental Response and Remediation (DERR) has prepared this Work Plan as part of Site Investigation (SI) activities at the 5600 South 900 East Plume, UTN000802664, (referred to as the "Site") in Murray, Salt Lake County, Utah. This SI was prepared under a cooperative agreement between DERR and the U.S. Environmental Protection Agency, Region VIII (EPA). The sampling described in this SI Work Plan will evaluate soil and ground water contamination as well as delineate possible exposure pathways and targets.

The DERR completed a Preliminary Assessment (PA) report for the 5600 South 900 East Plume Site in July 2008. Information used to prepare this Work Plan was obtained from the PA report as well as from additional sources cited following this document.

2.0 OBJECTIVES

This Work Plan will provide a framework for data collection and sampling activities at the Site and assess if historical activities caused a release of hazardous substances that pose a threat to human health and the environment. The findings from this investigation will be used to evaluate if significant releases occurred and/or exist to warrant pursuing "listing" the site on the EPA's National Priorities List or cleanup of the Site under some other program or authority. Soil and ground water samples will be collected from on site locations to determine the extent and degree of contamination from tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC).

The objectives of this SI are to:

- Determine the presence or absence of contamination and/or source areas in selected media at the site;
- Assess the characteristics of potential contamination;
- Assess the potential routes for contaminant migration;
- Assess the suspected exposure pathways;
- Identify potential targets that may be affected by on site contamination as well as other targets that may be impacted by the migration of the contamination via the suspected exposure pathways.

3.0 BACKGROUND INFORMATION

3.1 Site Location

The 5600 South 900 East Plume Site is located in Murray, Salt Lake County, Utah (Figure 1). The geographical coordinates for the Site are 40° 38' 58" north latitude and 111° 51' 57" west longitude. The elevation of the Site is approximately 4,342 feet above mean sea level.

The area immediately surrounding the Site is zoned by the City of Murray as commercial development conditional (City of Murray, 2008) and is located at a moderate to heavily trafficked intersection. There are many retail shops and businesses in the general area with a residential community just beyond this area. Additionally, the area is mostly covered with asphalt, sidewalks, and structures (Figure 2 and Figure 2-A).

The 5600 South 900 East Plume Site is located approximately 14 miles south of Salt Lake City in Murray, Utah. To reach the Site from Salt Lake City, travel south from I-80 West/I-215 for about 11.6 miles. Take exit 11 to US-89/State Street and turn north onto S. State Street/US-89 for 0.1 miles. Turn east onto E. Winchester Street for 1.3 miles. Turn north onto 900 East and travel for 1.2 miles. The 7-Eleven convenience store is on the northwest corner of 5600 South 900 East intersection.

3.2 Site History

In October 2002, SECOR International Incorporated (SECOR), a private consulting firm, removed three leaking underground storage tanks (LUSTs), one product dispenser island, and associated piping at a 7-Eleven store located at 5585 South 900 East in Murray. Subsurface investigations were performed to characterize the soils and ground water related to removal of the LUSTs. Eighteen ground water monitoring wells were installed and shallow ground water was encountered at approximately eight feet below ground surface (bgs) and was noted to flow west-northwest. Ground water samples were collected and analyzed for Volatile Organic Compounds (VOCs) on December 10, 2003, December 18, 2003, February 11, 2004, and May 5, 2004. Elevated levels of PCE, TCE, cis-1,2-DCE, and VC were detected during this sampling period (DERR, 2008). Specifically, PCE ranging from 2.3 to 500 micrograms per liter (µg/L), TCE ranging from 2.1 to 54 µg/L, cis-1,2-DCE ranging from 2.8 to 67 µg/L, and VC ranging from 1.6 µg/L to 11 µg/L were detected. The Superfund Chemical Data Matrix (SCDM) drinking water maximum contaminant level (MCL) is 5 µg/L for PCE and TCE, 70 µg/L for cis-1,2-DCE, and 2 µg/L for VC (SCDM, 2004).

SECOR also conducted a separate subsurface investigation at Jiffy Lube located directly across the street from the 7-Eleven store at 5601 South 900 East. PCE was detected in ground water at a concentration of 100 µg/L at Jiffy Lube on March 11, 1999. TCE, cis-1,2-DCE and VC were not detected. SECOR concluded in their report "PCE may be present due to activities at the adjacent dry cleaners, which is proximal to the sample location that contained PCE" (DERR, 2004).

The Red Hanger Cleaners currently located at 926 East 5600 South has been in operation since at least 1991. It is approximately 70 yards southeast and up gradient from the Site. Before this business relocated to its current location, the Red Hanger Cleaners was historically located at 5575 South 900 East and was in operation from 1975 through at least 1985. It was approximately 25-30 yards northwest and down gradient from the Site (Figure 3). A Pizza Hut restaurant replaced Red Hanger Cleaners and now occupies that site.

Village Cleaners has operated at 840 East 5600 South since at least 1984. It is approximately 190 yards down gradient and cross gradient to the west from the Site. Prior to it being Village Cleaners, it was known as Norge Cleaning Village and was in business dating back to at least 1970.

A review of the Polk Directories also reveals that in 1980 there was a laundromat called Leisure Time Laundry located at 925 East 5600 South (Figure 3; Polk, 1950-1990). This laundromat was historically located where Fisher's Creative Car Care now resides. During a phone conversation, the property owner disclosed that dry cleaning was not a part of this business (Siebert, 2008).

3.3 Physical Conditions

3.3.1 Hydrogeology

Ground waters of Salt Lake Valley are distinguished into four aquifers located in basin-fill deposits of primarily Quaternary and late Tertiary age (Hely, et al, 1971). The ground water regime is composed of a (1) a shallow unconfined aquifer, (2) a confined (artesian) aquifer underlying the shallow unconfined aquifer, (3) a deep-unconfined aquifer between the confined aquifer and the mountains, and (4) unconfined perched aquifers. The artesian aquifer and the deep unconfined aquifers together constitute the primary source of most ground water, also recognized as the principal aquifer. All of the unconsolidated water-bearing materials in the valley are connected hydraulically to some degree; thus together they compose the ground water reservoir of the Salt Lake Valley (Seiler and Waddell, 1984). In general, ground water flow is from the mountain fronts toward the Jordan River and subsequently to the northwest toward Great Salt Lake (Figure 4; Anderson, et al, 1994).

The Site is located in a discharge area and is about 1.5 miles north of a secondary recharge area. A discharge area is described as an area where the direction of ground water movement is upward from the principal aquifer to the shallow unconfined aquifer. Discharge areas generally occur in the center or topographically lowest part of the valleys. Water levels in wells in the area of the Site vary significantly due to pumping, and therefore recharge classification is difficult. Many water levels in wells in this area are above the land surface most of the time, therefore, the area is mapped as a discharge area. Variations in water levels in this area indicate that recharge-area boundaries are transient with time (Anderson, et al, 1994).

3.3.2 Hydrology

The Site topography is generally flat with a slight slope to the northwest. The Site terrain consists mainly of asphalt and concrete parking lots, sidewalks, commercial structures, and thin strips of grassy/vegetated areas. Because the Site is largely covered, most of the surface runoff is collected in a storm drain system. On portions of the Site that are not covered, precipitation percolates into the subsurface. Generally speaking, shallow ground water in the Salt Lake Valley eventually discharges to the Jordan River. The Jordan River is located approximately three miles west of the Site and flows in a northwest direction towards the Great Salt Lake.

Two major creeks are located within the vicinity of the Site. Big Cottonwood Creek is located approximately 1.1 miles north of the Site and Little Cottonwood Creek is located approximately 0.5 miles west of the Site. A small annual stream northwest of the Site flows through the length of a nearby golf course and is approximately 0.3 miles from the Site. These waterways flow in a general northwest direction towards the Jordan River (DERR, 2008).

3.3.3 Geology

The Site is located in the eastern portion of the Salt Lake Valley, which is bordered by the Oquirrh Mountains on the west and the Wasatch Range on the east. The Wasatch Range defines a boundary zone between the middle Rocky Mountain Physiographic Province to the east, and the Basin and Range Physiographic Province to the west (Hely et al, 1971). It is characterized by short, north-south trending mountain ranges bounded by a horst and graben normal fault system with upthrown mountainous areas separated in between by alluvium-filled valleys. The Wasatch Range is underlain by the active Wasatch Fault system. This system is a major geologic structure which extends generally north and south for a distance of approximately 210 miles. Vertical movement along this fault system exceeds three miles (Arnow et al, 1970). The Wasatch Range has virtually no foothills along its western boundary. The front rises abruptly from the valley floor and many smaller spurs that may have extended out into the valley have been truncated into steep-sloped remnant fault scarps as a result of active fault movement (Hely et al, 1971).

Surface topography is a reflection of the underlying geology and is characterized by deep, narrow, sediment-filled grabens filled by several thousand feet of lake sediments and alluvium eroded from the adjacent mountains. These deposits are unconsolidated and consist primarily of materials ranging from clay to sand, with some inclusion of layers that consist of gravel or boulders as well. Quaternary deposits in the central and southern portions of the Salt Lake Valley are thinnest toward the east and west perimeter of the valley near the mountains, and reach their greatest thickness, between 200 to 700 feet, toward the central axis of the valley. In the north and northeast portion of the valley, Quaternary deposits reach a maximum thickness that exceeds 2,200 feet. These deposits extend westward and gradually thin out over a distance of approximately 11 miles to a thickness of about 1,200 feet near the shore of the Great Salt Lake (Arnow et al, 1970).

Soil profile information was obtained from the DERR office files of LUST site investigations that were completed in the vicinity. During LUST removal activities at the 7-Eleven facility, native soils encountered consisted primarily of fine-grained lacustrine deposits composed of brown clayey silts and silty sands to 12 feet bgs (DERR, 2004). At Jiffy Lube, soil beneath the site consisted primarily of poorly graded, medium to fine-grained sand with silt to a soil sampling depth of eight feet bgs (DERR, 1999).

3.3.4 Meteorology

The Site is located in a semi-arid climate. Meteorologic conditions at the site vary depending upon season and location of passing storm fronts. Meteorologic data was obtained from the Midvale weather station for the period 1948 - 1971. Midvale is approximately 4.5 miles southwest of Murray. The average maximum and minimum annual temperatures are 64.7° and 38.1°, respectively. The average annual total precipitation is 14.33 inches and the average annual total snowfall is 45.3 inches with an average snow depth of one inch (WRCC, 2008).

3.4 Preliminary Pathway Analysis

3.4.1 Waste Source Characterization

Source materials are likely to be present below the ground surface at the Site and are likely to include PCE, TCE, cis-1,2-DCE, and VC. Currently there is a dry cleaning business that has operated for 17 years and is located southeast of the Site. Historically, this dry cleaning facility was located across the street and approximately 100 yards northwest of its current location. Contamination from chlorinated solvents may be found below the ground surface at this historic location as well.

3.4.1.1 PCE

PCE is a manufactured chemical commonly used for dry cleaning and metal degreasing. Exposure to very high concentrations of PCE can cause dizziness, headaches, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness and death. It is a nonflammable liquid at room temperature. It evaporates easily into the air and has a sharp, sweet odor. Most people can smell PCE when it is present in the air at a level of one part per million parts of air (1 ppm) or more, although some can smell it at lower levels. Much of the PCE that gets into water or soil evaporates into the air. Microorganisms can break down some of the PCE in soil or underground water under rare conditions. In the air, it is broken down by sunlight into other chemicals or brought back to the soil and water by rain. PCE has not been shown to bioaccumulate in fish or other animals that live in water. The U.S. Department of Health and Human Services (DHHS) has determined that PCE may reasonably be anticipated to be a carcinogen. PCE has been shown to cause liver tumors in mice and kidney tumors in male rats (ASTDR, 1997).

3.4.1.2 TCE

TCE is a colorless liquid which is used as a solvent for cleaning metal parts and can be a byproduct of PCE biodegradation. Drinking or breathing high levels of TCE may cause nervous system effects, liver and lung damage, abnormal heartbeat, coma and possibly death. TCE is a nonflammable, colorless liquid with a somewhat sweet odor and a sweet, burning taste. It is used mainly as a solvent to remove grease from metal parts, but it is also an ingredient in adhesives, paint removers, typewriter correction fluids, and spot removers. TCE dissolves a little in water, but can remain in ground water for a long time. It quickly evaporates from surface water, so it is commonly found as a vapor in the air. TCE evaporates less easily from the soil than from surface water and may persist in the environment by sticking to soil particles. It may stick to particles in water, which will cause it to eventually settle to the bottom sediment. TCE has not been shown to build up significantly in plants and animals. Both the National Toxicology Program and International Agency for Research on Cancer have determined that TCE is a probable human carcinogen (ASTDR, 2003).

3.4.1.3 CIS-1,2-DCE

Cis-1,2-DCE is a highly flammable, colorless liquid with a sharp, harsh odor. It is used to produce solvents and in chemical mixtures. Very small amounts of it can be smelled in the air. Cis-1,2-DCE evaporates rapidly into the air. Cis-1,2-DCE can travel through soil or dissolve in water in the soil. It is possible that it can contaminate ground water. In ground water, it takes about 13-48 weeks to break down. Breathing high levels of cis-1,2-DCE can make you feel nauseous, drowsy, and tired; breathing very high levels can kill you. Animals that ingested extremely high doses of cis-1,2-DCE died. Lower doses of cis-1,2-DCE caused effects on the blood, such as decreased numbers of red blood cells, and also effects on the liver. The long-term (365 days or longer) human health effects after exposure to low concentrations of cis-1,2-DCE are not known. One animal study suggested that an exposed fetus may not grow as quickly as one that has not been exposed. Exposure to cis-1,2-DCE has not been shown to affect fertility in people or animals. The EPA has determined that cis-1,2-DCE is not classifiable as to its human carcinogenicity (ASTDR, 1997).

3.4.1.4 VINYL CHLORIDE

Vinyl chloride is a colorless gas. It burns easily and is not stable at high temperatures. It has a mild, sweet odor. It is a manufactured substance that does not occur naturally. It can be formed when other substances such as PCE and TCE are broken down. Exposure to vinyl chloride occurs mainly in the workplace. The U.S. DHHS has determined that vinyl chloride is a known carcinogen. Breathing high levels of vinyl chloride for short periods of time can cause dizziness, sleepiness, unconsciousness, and at extremely high levels can cause death. Breathing vinyl chloride for long periods of time can result in permanent liver damage, immune reactions, nerve damage, and liver cancer. Liquid vinyl chloride evaporates easily. Vinyl chloride in water or soil evaporates rapidly if it is near

the surface. Vinyl chloride in the air breaks down in a few days to other substances, some of which can be harmful (ASTDR, 2006).

3.4.2 Soil Exposure Pathway Analysis

The Site is zoned as commercial development conditional by the City of Murray. There are many retail shops and businesses in the general area and a residential community surrounds this area. The areas of greatest soil exposure are strips of greenery used as landscaping. Most of the area, however, is covered with concrete, asphalt and structures (Figure 2). Any soil that is contaminated is likely underneath these covered areas. The DERR therefore does not believe on-site soils present a significant risk to those who access the Site area. However, additional information about the soil contamination should be collected and will be used to characterize the nature of contamination, soil exposure pathway and potential for soil contamination to impact ground water at the Site.

3.4.3 Ground Water Exposure Pathway Analysis

There are 117 wells within four miles of the Site that supply water to one non-public and 13 public supply systems with a combined population of over 640,000. The nearest drinking water well is a City of Murray municipal well located approximately 360 feet southeast of the Site. VOCs were obtained by the City of Murray on August 15, 2007 and the analytical laboratory results were non-detect. A second municipal well located 250 feet east of this well was abandoned by the City of Murray because of its low productivity. There was no contamination found in this well (City of Murray, 2008).

The threat of PCE, TCE, cis-1,2-DCE, and VC from dry cleaning activities leaching into the ground water is a concern. As previously mentioned in 3.2 of this report, chlorinated solvent contaminants were observed in ground water samples obtained during subsurface investigations associated with LUST removal sites. PCE, TCE, and VC exceeded the MCL. A ground water pathway investigation is recommended during the SI to further evaluate possible ground water impacts.

3.4.4 Surface Water Pathway Analysis

There are 297 surface points-of-diversion within four miles of the Site. Data provided by the Utah Division of Water Rights indicates some of these points-of-diversion are used for domestic and municipal purposes (DWR, 2008). Two major creeks are located in the vicinity of the Site. Big Cottonwood Creek is located approximately 1.1 miles north of the Site and Little Cottonwood Creek is located approximately 0.5 miles west of the Site. A small annual stream northwest of the Site flows through the length of a nearby golf course called Mick Riley Golf Course. This stream is approximately 0.3 miles from the Site and flows down gradient into Big Cottonwood Creek (Figure 1). This golf course also has several drainage ponds on site. Surface waters collected in storm drains in the vicinity of the Site flow to these drainage ponds. Some of the pond water may be used as irrigation for the golf course but any runoff from the ponds then discharges into Big Cottonwood Creek (City of Murray, 2008). The Site is relatively flat with a slight

northwest slope and is located in an arid environment. Surface runoff from the Site may also reach Little Cottonwood Creek due to its close proximity and down gradient location. Big Cottonwood Creek and Little Cottonwood Creek flow in a general northwest direction and are tributaries to the Jordan River. The Jordan River flows in a north-northwest direction and flows to the Great Salt Lake which is approximately 20 miles down gradient from the Site.

Surface water targets include Little Cottonwood Creek, Mick Riley Golf Course annual stream and drainage ponds, Jordan River, wetlands along the river, and various species of animal and plant life.

3.4.5 Air Exposure Pathway Analysis

The Site is mostly covered by concrete, asphalt and structures. Workers and customers are on site almost daily. There is a resident population of 1056 living within a quarter-mile of the Site, increasing to 15,271 people within one mile of the Site (DERR, 2008).

Currently the air exposure pathway is of limited concern at this Site. PCE, TCE, cis-1,2-DCE, and VC are the primary contaminants of concern that were detected in the ground water and the possibility of volatilization into the atmosphere is unlikely due to concrete and asphalt covering most of the exposed soil. This does not appear to be a significant route of exposure for the human population on or off site and no air sampling is recommended at this time.

4.0 FIELD PROCEDURES

4.1 Concept of Operations

4.1.1 Schedule

Sampling for this SI is tentatively scheduled for the Fall of 2008 and is contingent upon the EPA's approval of this Work Plan. Field activities are expected to last two to three days depending on conditions at the Site. Coordination with landowners, lessees, laboratories and local health authority is on-going and concurrent with this Work Plan. All logistical functions will be arranged by the Project Manager in advance of sampling.

4.1.2 Safety

On site personnel will avoid direct dermal contact, inhalation, and ingestion with on site materials. Sampling will be conducted in Level D personal protective equipment (PPE) unless the Project Manager, upon evaluation of site conditions, deems an upgrade necessary. A detailed Health and Safety Plan will be prepared and reviewed with field personnel prior to the beginning of any fieldwork. A Tailgate Safety Meeting form will be provided and reviewed by all personnel prior to the start of activities each field day.

In the event of an accident, the nearest hospital is Cottonwood Hospital at 5770 S 300 E in Murray, Utah. A map of the route to the hospital from the Site has been included as Figure 5.

4.1.3 Site Access and Logistics

Site access will be arranged by the Project Manager. The landowners/lessees will be asked to sign a DERR Grant of Access to Property form (Appendix A) prior to sampling. Coordination with the contract laboratory, landowners/lessees, local health authorities and contractors will be handled by the Project Manager and will be finalized at least 10 days prior to the commencement of field activities. Other logistical functions will also be arranged by the Project Manager.

4.2 Sample Locations

4.2.1 Source Samples

The Red Hanger Cleaners is currently in business and is directly southeast of the 7-Eleven convenience store. A previous site visit confirmed that dry cleaning operations are performed on site. Previous ground water samples were obtained and analyzed as part of subsurface ground water investigations associated with LUST removal sites. The PA report did not determine storage or waste handling practices relating to the dry cleaning operations currently or during historic times. The potential of contamination in various locations on the property is likely to exist.

4.2.2 Soil Samples

Ten soil samples will be collected from the Site (5600-SO-11 – 5600-SO-20; Figures 2, 2-A and 3, Table 1). Samples collected from the property are proposed to investigate the area around the Red Hanger dry cleaner and the historic Red Hanger dry cleaner location where possible releases or dumping of PCE may have occurred on the two properties. Samples will also be collected at the municipal well that is closest to the Site (New Howe Well) as well as the two nearby municipal wells that are down gradient from the Site (5th E Well #3 and Highland Dairy Well). Samples will be collected using a continuous direct push sampling device and soil borings will continue until ground water is encountered. Samples collected from the borings will be analyzed at a Contract Laboratory Program (CLP) laboratory and analyzed for VOCs using EPA Method 8260.

4.2.3 Ground Water Samples

Ten ground water samples will be collected from the Site at each of the soil boring locations (5600-GW-01 – 5600-GW-10; Figures 2, 2-A and 3, Table 1). The objective of this sampling will be to determine if ground water has been affected by contamination. Samples will be analyzed for VOCs using EPA Method 8260.

4.2.4 Background Samples

To determine whether a hazardous substance is present significantly above background, the background level must be known. One ground water background sample and one soil background sample will be collected approximately one-half mile southeast of the Site (5600-GW-11 and 5600-SO-21; Figure 2-A, Table 1). This site was chosen because it is a large dirt field that will offer easy access to the direct push sampling device and it is up gradient from the suspected plume location.

4.3 Sampling Methods

Sampling will proceed according to methods outlined in the DERR CERCLA Quality Assurance Project Plan (QAPP) of April 1999 and other relevant EPA guidance documents. All sampling events will be documented in a field log book. An equipment list is included as Appendix B.

4.3.1 Soil

Soil samples will be collected from continuous soil columns obtained using a direct push sampling device. The continuous borings will be screened in the field using a Photoionization Detector (PID) in increments of approximately one sample for every five feet of boring. Soil samples will be collected from the area of the boring with the highest PID reading or directly above ground water in the event that no elevated readings are detected with the PID. All samples will be placed directly into the appropriate sample containers and placed on ice in a cooler. Strict chain-of-custody procedures will be followed for all samples collected for shipment to the CLP laboratory for analysis.

Sample locations are selected based on areas suspected to be contaminated by PCE, TCE, cis-1,2-DCE, VC and historical information. The soil sample locations may have to be adjusted in the field because of the utilities or other site conditions that make the proposed sampling points inaccessible. Deviations from this Work Plan will be carefully documented in the field notes by the Project Manager and noted in the SI Analytical Results Report.

4.3.2 Ground Water

Ground water samples will be collected from the same direct push borings created to collect soil samples. All samples will be collected, unfiltered, using a peristaltic pump and placed directly into appropriately preserved hydrochloric acid (HCl) 40 mL vial sample containers and stored on ice. Tubing will be replaced between samples to avoid cross-contamination. All sample collection will proceed following strict chain-of-custody procedures and the samples will be shipped to a CLP laboratory for analysis. The ground water sampling locations are based on areas suspected to be contaminated by PCE, TCE, cis-1,2-DCE, and VC, historical information, and the direction of inferred ground water flow.

4.4 Investigation Derived Waste

The generation of investigation derived waste (IDW) is not anticipated. Should any IDW be collected, it will be disposed of in accordance with state and federal regulations and guidelines. Disposable sampling equipment will be removed from the Site and disposed of as non-hazardous waste. Excess sample and direct push cuttings will be returned to its original location.

4.5 Analytical Parameters

Environmental samples will be preserved by cooling with ice to 4° Celsius. Samples will be shipped as environmental samples via strict chain-of-custody procedures to a contract lab recognized under EPA's CLP and analyzed for analytes listed in previous sections of this report.

5.0 FIELD QUALITY CONTROL AND ASSURANCE PROCEDURES

Samples will be handled and preserved as per the criteria of the DERR QAPP of April 1999. The following designations will be made for samples: 5600 S 900 E (5600), Ground Water (GW), Soil (SO), and Sample Number. For example, ground water sample #1 would be labeled as 5600-GW-01.

6.0 CHAIN-OF-CUSTODY

Samples will be handled and delivered to the contract laboratory under strict chain-of-custody protocol as prescribed in the DERR QAPP of April 1999.

7.0 DATA REDUCTION, VALIDATION AND REPORTING

EPA will perform the data validation for the analytical procedures. After the receipt of the validated data from EPA, a draft Site Inspection Analytical Results Report will be prepared and submitted to EPA Region VIII for review.

8.0 REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR); 1997-2006, ***ToxFAQ's***, ATSDR web site: http://www.atsdr.cdc.gov/toxfaq.html.

Anderson, P. B., D. D. Susong, S. R. Wold, V. M. Heilweil, and R. L. Baskin; 1994, ***Hydrogeology of Recharge Areas and Water Quality of the Principal Aquifers Along the Wasatch Front and Adjacent Areas***, Utah, United States Geological Survey Water-Resources Investigations Report 93-4221.

Arnow, T., Van Horn, R., and LaPray, R.; 1970, ***The Pre-Quaternary Surface in the Jordan Valley***, Utah, U.S. Geological Survey Professional Paper 700-D.

City of Murray, Public Services; 2008; ***Personal visit, review of records and web site:*** http://www.murray.utah.gov, 4646 S 500 W, Murray, Utah, April.

Hely, A. G., R. W. Mower, C. A. Harr, and T. Arnow; 1971, ***Water Resources of Salt Lake County***, Utah, Utah Department of Natural Resources Technical Publication 31.

Polk, R. L. and Co.; 1950-1990, ***Partial Listing of Historical Dry Cleaners***, Utah Division of Response and Remediation (DERR).

SCDM (Superfund Chemical Data Matrix); 2004, ***Superfund Chemical Data Matrix***, Environmental Protection Agency Office of Emergency and Remedial Response, EPA web site: http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

Seiler, R. L., and K. M. Waddell; 1984, ***Reconnaissance of the shallow-unconfined aquifer in Salt Lake Valley, Utah***, United States Geological Survey, Water-Resources Investigations Report 83-4272.

Siebert, Ralph H.; 2008, ***Personal Communication***, property owner of 929 East 5600 South, Murray, UT where Fisher's Creative Car Care is located, June 10.

Utah Division of Environmental Response and Remediation (DERR), Leaking Underground Storage Tank Section (LUST); 1999 site closure, ***File #4000747***, located in the DERR Office at 168 N 1950 W, Salt Lake City, Utah.

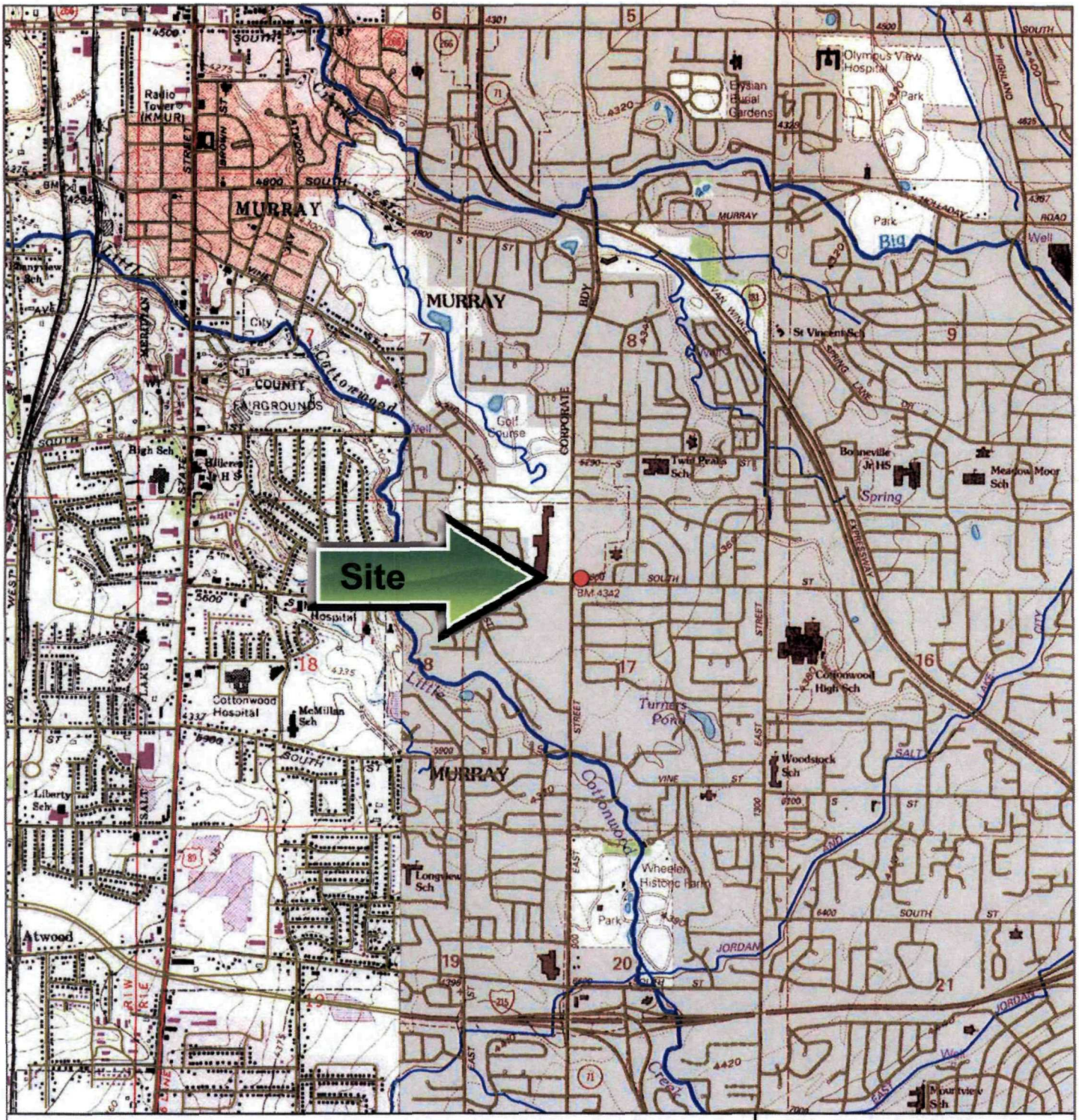
Utah Division of Environmental Response and Remediation (DERR), Leaking Underground Storage Tank Section (LUST); 2004 site closure, ***File #4001033***, located in the DERR Office at 168 N 1950 W, Salt Lake City, Utah.

Utah Division of Environmental Response and Remediation (DERR); 2008, ***Preliminary Assessment for 5600 South 900 East Plume,*** Murray, Utah, May.

Utah Division of Water Rights (DWR); 2008, ***Water Rights Points-of-Diversion Data*** (from a GIS database), February.

Western Regional Climate Center (WRCC); http://www.wrcc.dri.edu. Online. Internet. Accessed on 30 June 2008.

Figures



Legend

- 5600 South 900 East Plume site
- Major Roads
- Railroads
- Water Courses

Base Map: United States Geological Survey toporaphic map, 1999

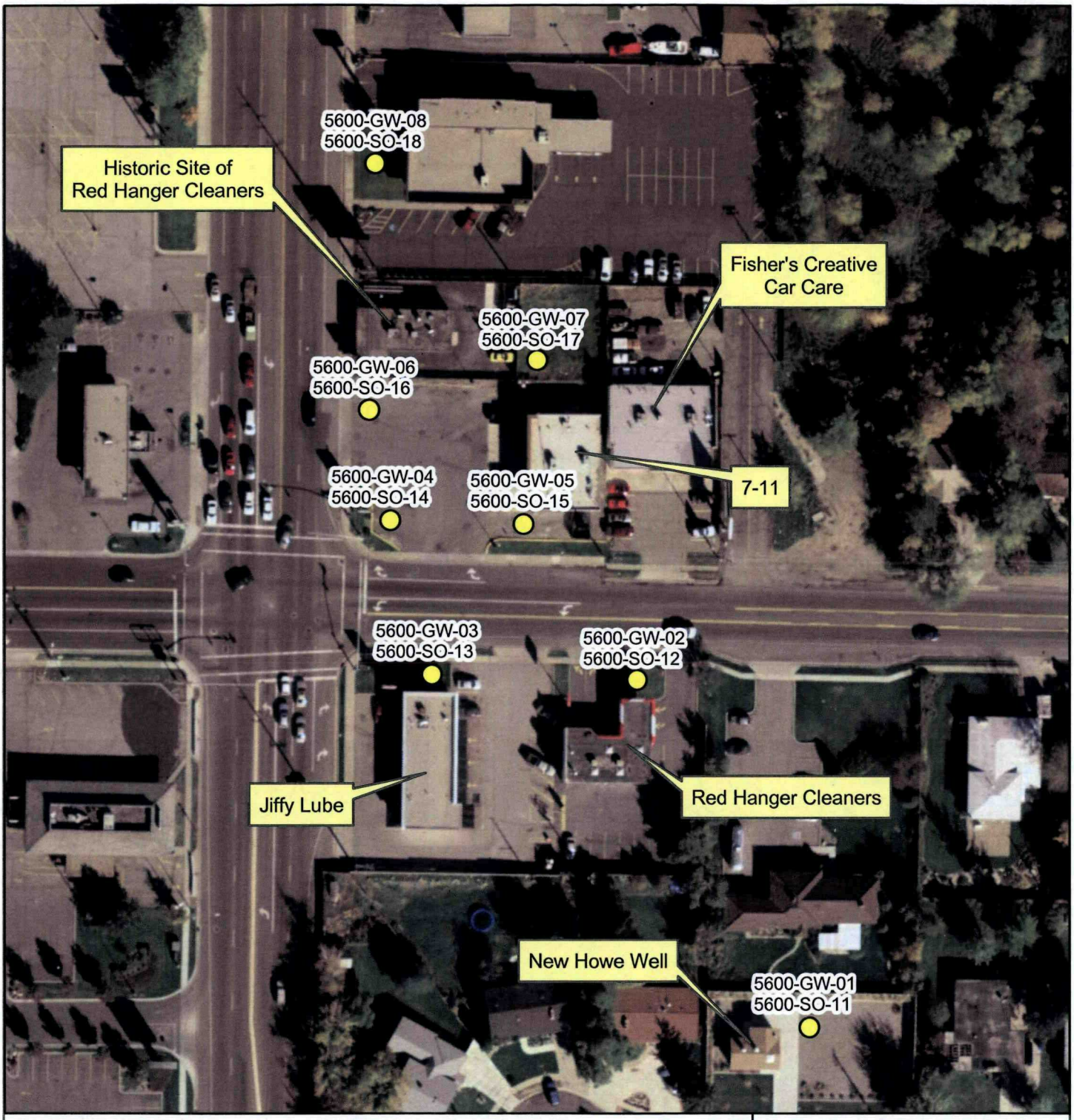
N
W E
S

Utah Department of Environmental Quality
Division of Environmental Response and Remediation

Figure 1
Site Location

5600 South 900 East Plume
Salt Lake County, Utah

by: Kim Viehweg date: 6/04/08



0 45 90 180 270 360 Feet

Utah Department of Environmental Quality
Division of Environmental Response and Remediation

Legend

Proposed Sample Locations

5600-GW-01
5600-SO-11
Ground water and soil boring locations

Aerial photograph obtained from the State of Utah GIS database, 2006

N
W E
S

Figure 2
Site Map

5600 South 900 East Plume
Salt Lake County, Utah

by: Kim Viehweg date: 4/11/08

0 0.1 0.2 0.4 0.6 Miles

Legend

- Proposed Sample Locations
- 5600-GW-11, 5600-SO-21: Ground water and soil boring locations

N W E S

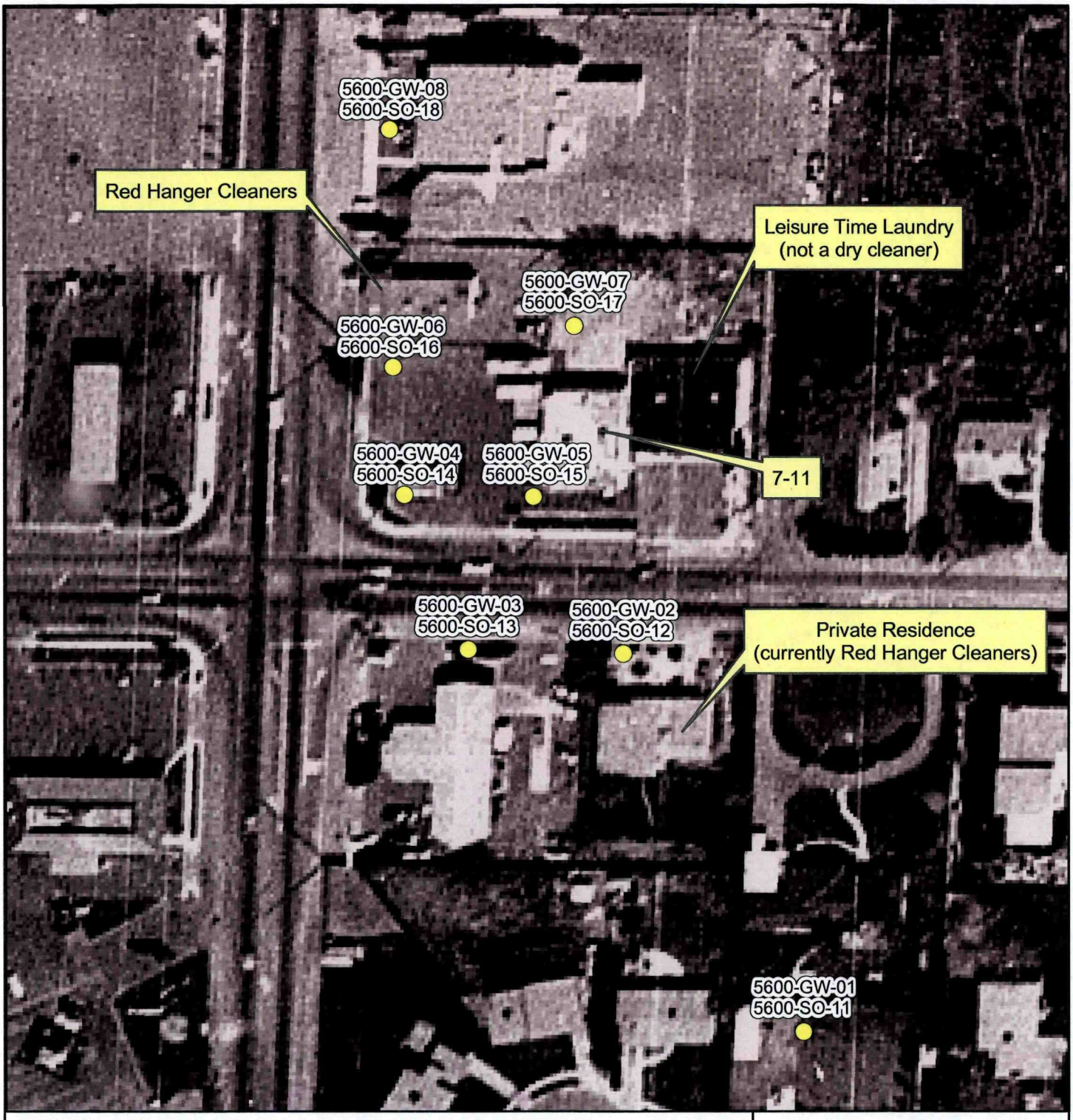
Aerial photograph obtained from the State of Utah GIS database, 2006

Utah Department of Environmental Quality
Division of Environmental Response and Remediation

Figure 2-A
Site Map

5600 South 900 East Plume
Salt Lake County, Utah

by: Kim Viehweg date: 4/11/08



0 45 90 180 270 360 Feet

Utah Department of Environmental Quality
Division of Environmental Response and Remediation

Legend

Proposed Sample Locations

5600-GW-01
5600-SO-11
Ground water and soil boring locations

Aerial photograph obtained from Olympus Aerial Surveys Inc.

N
W E
S

Figure 3
Historic Site Map
April 26, 1980

5600 South 900 East Plume
Salt Lake County, Utah

by: Kim Viehweg date: 4/11/08

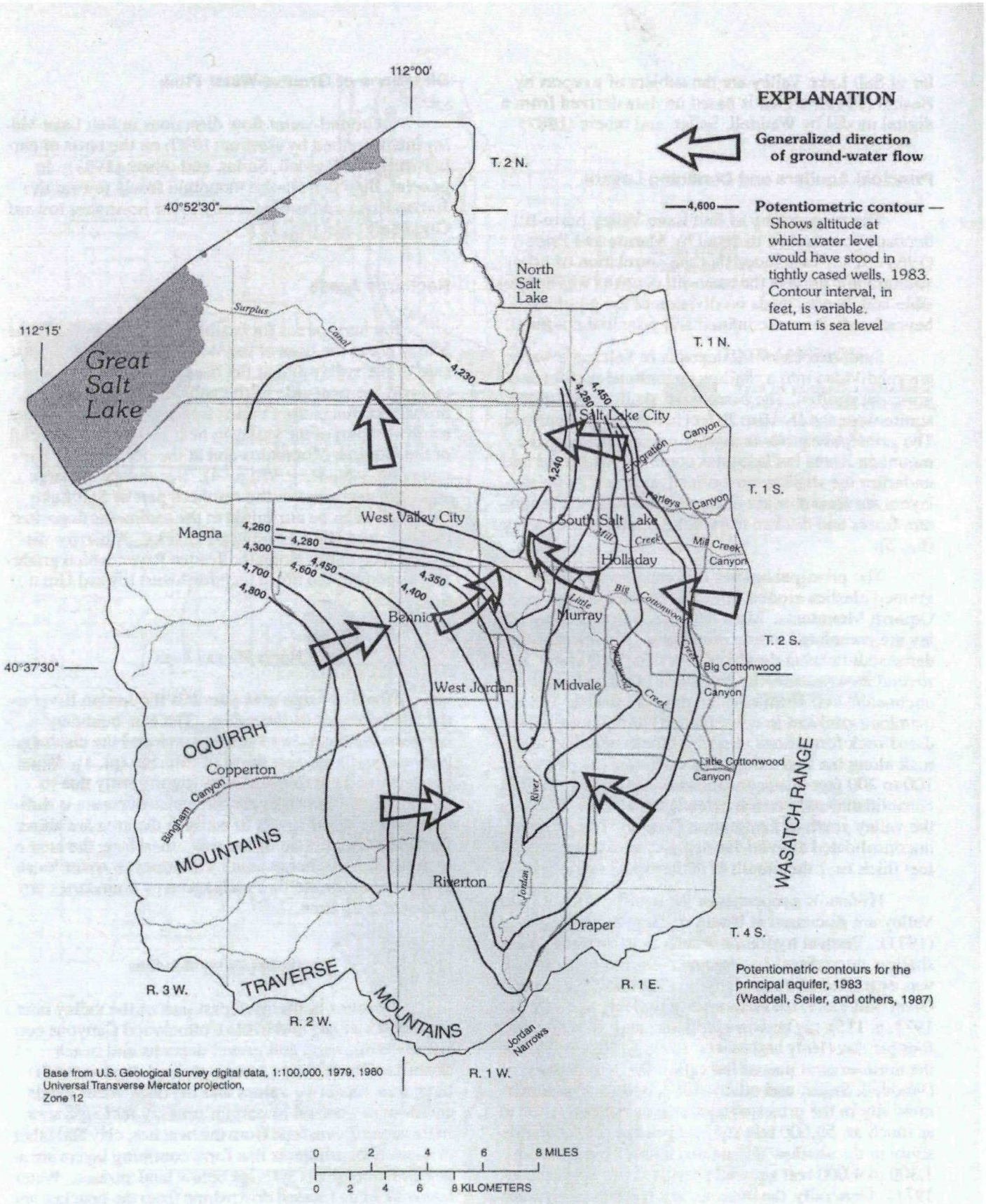


Figure 4: Ground water flow in the Salt Lake Valley (Anderson, et al, 1994).

0 0.1 0.2 0.4 0.6 0.8 Miles

Legend

- Start: 5600 S 900 E
- End: Cottonwood Hospital
- Route to Hospital

N W E S

Aerial photograph obtained from the State of Utah GIS database, 2006

Utah Department of Environmental Quality
Division of Environmental Response and Remediation

Figure 5
Hospital Route

5600 South 900 East Plume
Salt Lake County, Utah

by: Kim Viehweg date: 4/11/08

Tables

Table 1

Summary of Sample Collection
5600 South 900 East Plume

Field Sample No.	Matrix	Container[1]	Location	Rationale	VOCs	QA/QC
5600-GW-01, 5600-SO-11	Water/Soil	40 mL Vials, Glass Jars	Parking Lot New Howe Well	Test for VOCs	X	MS/MSD[2]
5600-GW-02, 5600-SO-12	Water/Soil	40 mL Vials, Glass Jars	Parking Lot Red Hanger Cleaners	Test for VOCs	X	
5600-GW-03, 5600-SO-13	Water/Soil	40 mL Vials, Glass Jars	Parking Lot Jiffy Lube	Test for VOCs	X	
5600-GW-04, 5600-SO-14	Water/Soil	40 mL Vials, Glass Jars	Parking Lot 7-11	Test for VOCs	X	
5600-GW-05, 5600-SO-15	Water/Soil	40 mL Vials, Glass Jars	Parking Lot 7-11	Test for VOCs	X	
5600-GW-06, 5600-SO-16	Water/Soil	40 mL Vials, Glass Jars	Parking Lot 7-11	Test for VOCs	X	
5600-GW-07, 5600-SO-17	Water/Soil	40 mL Vials, Glass Jars	Parking Lot Valley Bank	Test for VOCs	X	
5600-GW-08, 5600-SO-18	Water/Soil	40 mL Vials, Glass Jars	Parking Lot Valley Bank	Test for VOCs	X	Blind Duplicate[2]
5600-GW-09 5600-SO-19	Water/Soil	40 mL Vials, Glass Jars	Parking Lot Highland Dairy Well	Test for VOCs	X	
5600-GW-10 5600-SO-20	Water/Soil	40 mL Vials, Glass Jars	Parking Lot 5th E Well #3	Test for VOCs	X	
5600-GW-11 5600-SO-21	Water/Soil	40 mL Vials, Glass Jars	Up gradient	Test for VOCs	X	Background
5600-GW-12 5600-SO-22	Water	40 mL Vials	Cooler	Detect Introduced Contamination	X	Trip Blank

[1] Soil samples require one 4-oz glass jar for each analysis.
[1] Water samples require three 40 mL glass vials preserved with HCL for VOC analysis.
[2] Blind Duplicate for water and soil will be labeled on the Chain of Custody as a separate sample.
[2] MS/MSD requires triple volume for VOCs in water sample.

Appendices

Appendix A

DERR Grant of Access to Property Form

GRANT OF ACCESS TO PROPERTY

_____ is the owner ("Owner") of record, title holder or authorized agent for the record owner of certain real property located at _____ ("Property").

The Owner hereby grants to the officers, employees, authorized representatives, and consultants of the Utah Division of Environmental Response and Remediation ("DERR") access, including ingress and egress, to the Property for the following purposes:

- the drilling of one borehole with a probe rig;
- the collection of soil and ground water from this borehole; and
- the taking of photographs of sample locations.

The expected timeframe for this operation would reasonably be 2 to 3 hours, and would occur either on a grassy strip of lawn or in a corner of the parking lot. After sampling, the borehole would be appropriately backfilled to its original condition. Prior to boring, the site would be surveyed for the presence of any utility and/or fuel lines to avoid hitting any underground lines during the investigation. All attempts will be made to avoid impacting business traffic and parking during the boring operation.

I understand that these actions by UDEQ are undertaken pursuant to its responsibilities under the Utah Environmental Quality Code, Sections 19-1-101 *et seq.* and 19-6-301 *et seq.*, and the U.S. Comprehensive Environmental Response, Compensation, and Liability Act (Superfund), 42 U.S.C. s. 9601, *et seq.*

By granting access to the DERR, I make no admission of liability or responsibility for any contamination, which may be found on the Property. This written permission is provided voluntarily with knowledge of my right to refuse access. I further acknowledge that no promises, representations or claims of any kind, either written or oral have been made by the DERR to induce my consent.

_____ _____

(Owner's Signature) (Title)

_____ _____

(Printed Name) (Date)

Please sign and return via mail or fax to:

Kim Viehweg
Utah Department of Environmental Quality
P.O. Box 144840, SLC, UT 84114-4840
Phone 801-536-4161 / fax: 801-536-4242
Email: kviehweg@utah.gov

Telephone# (___)_____

Appendix B

Equipment List

SAMPLING EQUIPMENT CHECKLIST

for Site Inspection or Expanded Site Inspection

SITE: 5600 South 900 East Plume **DATE:** Fall 2008

PROJECT MANAGER: Kim Viehweg **TITLE:** Environmental Scientist

LIST COMPILED BY: Kim Viehweg **TITLE:** Environmental Scientist

Sample Containers

Quantity	Unit	Item	Notes
1	case	40 ml VOA Vials	72 vials per case
33	each	40 ml VOA Vials	
____	case	½ gal Amber Bottles	6 bottles per case
____	each	½ gal Amber Bottles	
____	case	1 liter plastic bottles	12 bottles per case
____	each	1 liter plastic bottles	
____	case	8 oz. Wide mouth jar	24 jars per case
____	each	8 oz. Wide mouth jar	
1	case	4 oz. Wide mouth jar	24 jars per case
10	each	4 oz. Wide mouth jar	
1	bundle	Plastic Sample Bags, 4" by 6"	100 per bundle, holds 2 - 40 ml vials
____	bundle	Plastic Sample Bags, 6" by 9"	100 per bundle, holds 1 - 8 oz. jar
____	bundle	Plastic Sample Bags, 5" by 12"	100 per bundle, holds 1 - 1 liter bottle
____	bundle	Plastic Sample Bags, 9" by 12"	50 per bundle, holds paperwork & ice
____	bundle	Plastic Sample Bags, 12" by 18"	50 per bundle, holds 1 - ½ gal amber bottle
____	each	Paint Cans, 1 quart	
____	each	Paint Cans, 1 gallon	
____	_____	Vermiculite	

Sample Preservation

Quantity	Unit	Item	Notes
2	bag	ice	not supplied - needs to be purchased
____	case	Nitric Acid	24 - 5 ml vials per case
____	each	Nitric Acid	5 ml vial
1	case	Hydrochloric Acid	24 - 1 ml vials per case
33	each	Hydrochloric Acid	1 ml vial
____	_____	Acetic Acid	not typically used
____	_____	Sodium Hydroxide	not typically used
____	_____	Other: _____	
____	_____	Other: _____	

Sample Documentation

Quantity	Unit	Item	Notes
1	each	Laptop Computer w/ Forms II Lite	
1	each	Field Printer	
1	each	Box w/supplies for printer	
1	each	Field Book	
	each	CLP Labels	
	each	CLP Sample ID Tags	
	each	CLP Custody Seals	
	each	Chain-of-Custody Forms	if not using Forms II Lite
1	each	Digital Camera	include recharger
	each	Digital Storage Cards	
	each	35mm Camera	
	roll	35mm Film	speed (asa): exposure:
	each	Video Camera	
	each	Video Cassettes for video camera	

Reference Materials

Quantity	Unit	Item
1	each	Site Sample Plan (unique to site)
1	each	Health and Safety Plan (unique to site)
	each	Samplers Guide to Contract Laboratory Program, EPA OSWER, 1996
	each	Quality Assurance Project Plan, UDEQ/DERR, 1999
	each	Other: _____
	each	Other: _____

Sample Shipping

Quantity	Unit	Item	Notes
2	each	Ice Chest	
1	box	Bubble Wrap	
2	each	FedEx Airbills	
1	roll	Packaging Tape	
	roll	Strapping Tape	
		Cardboard	Boxes for shipping or pieces for padding
2	each	Custody Seals	Also Listed under Sample Documentation
		Other: _____	
		Other: _____	
		Other: _____	
		Other: _____	

Decontamination

Quantity	Unit	Item	Notes
____	each	Tap water	in 5 gallon carboy
____	each	Distilled Water	in 5 gallon carboy
____	each	Deionized Water	in 5 gallon carboy
____	box	Alconox	4 lb. Box
____	each	Rinse Water Sprayer	
____	each	Deionized Water Sprayer	
____	each	Rinse Water Spray Bottle	
____	each	Deionized Water Spray Bottle	
____	each	Bucket or Tub	
____	each	Scrub Brush	
1	roll	Paper Towels	
____	box	Kimwipes	
1	bottle	Hand Sanitizer	
____	container	Antibacterial Towelettes	
1	each	Garbage bags	

Sample Collection

Quantity	Unit	Item	Notes
____	each	Metal Spoons	
____	each	Shovel	
____	each	Hand Auger	
1	each	Peristaltic Pump	include charger/power supply
____	roll	¼ O.D. Poly tubing	1000' per roll - use down well w/peristaltic pump
1	roll	Silcon/Tygon tubing	100' per roll - use w/peristaltic pump
____	each	¾" Disposable Bailer	include valves for sampling
____	each	1½" Disposable Bailer	include valves for sampling
____	roll	Nylon Line	for use with bailers
____	each	Plastic Dropcloths	to cover ground around well while bailing
1	each	Bucket/Barrel/Tank	to contain purge/decon waste water
____	each	Submersible Pump	include control unit
____	each	Generator	power for submersible pump
____	each	Extension Cord	use with submersible pump
____	each	Hose	use with submersible pump
____	each	Flow Meter	
____	each	pH Meter	
____	each	Conductivity Meter	
____	package	Litmus Paper	
____	each	0.5 micron Filters	for dissolved metal samples
____	each	Well Sounder	

Surveying

Quantity	Unit	Item	Notes
1	each	Trimble GPS Unit	including recharger
____	each	Storey Pole	Optional - for use with GPS
____	each	Antenna	Optional - for use with GPS
____	each	Tape Measure	
____	each	100' (up to 300') Engineers Tape	
____	each	Tape Measure	
____	each	Measuring Wheel	
____	each	Hip Chain	include extra string
____	each	Brunton Compass	
____	bundle	Wooden Stakes	
____	bundle	Wooden Lathes	
____	bundle	Pin Flags	
____	roll	Surveyer's Flagging	
____	can	Inverted Tip Spray Paint, White	For marking proposed excavations for Blue Stakes
____	can	Inverted Tip Spray Paint	Color: _____
____	each	Inverted Paint Applicator	

Safety/Personal Protection (provided by Department for each employee, each field team member should individually bring the following)

Quantity	Unit	Item	Notes
1	each	Hard Hat	
1	each	Safety Glasses	
1	pair each	Steel-toed Boots	
____	each	Rubber Boots	
1	each	Full-face Respirator	
____	each	Cloth Overalls	
____	each	Cold Weather Gear	
1	each	Safety Vest	
1	each	Field Vest	
1	each	Rain Gear	
____	_____	Other: _____	
____	_____	Other: _____	
____	_____	Other: _____	
____	_____	Other: _____	

Additional Safety/Personal Protection

Quantity	Unit	Item	Notes
1	box	Disposable Latex/Nitrile Gloves	50 pair per box
	each	Tyvek Overalls	
1	each	Disposable Ear Plugs	
	each	Ear Muffs (hearing protection)	
	pair	Leather Gloves	
	each	Dust Mask (Disposable)	
	pair	Respirator Cartridges	Type:
	each	Life Vests/Flotation Devise	
	each	Body Harness	Use to tie off while sampling at edge of water
	each	Safety Lines	Use to tie off while sampling at edge of water
	bottle	Sunscreen	
	can	Insect Repellent	
	each	Drinking Water Cooler	
1	each	First Aid Kit	
1	bottle	Eyewash	
	can	Wasp Spray	
		Other:	
		Other:	
		Other:	

Miscellaneous Items

Quantity	Unit	Item	Notes
	each	Flashlight	
1	each	Tool Kit	
	pair	Binoculars	
	pair	2-way Radios	Include Batteries
	each	XRF Unit	Include Recharger
	each	Radiation Meter	Include Recharger/Batteries
	each	HNU Photoionization Detector	Include Recharger/Batteries
	each	Explosimeter/Oxygen Indicator	Include Recharger/Batteries
	each	H2S Indicator	Include Recharger/Batteries
	each	Organic Vapor Analyzer (OVA)	Include Recharger/Batteries
2	each	Maps	Title: Work Plan Sampling Maps
	each	Maps	Title:
		Other:	
		Other:	
		Other:	
		Other:	